GLOSSARY

Afforestation - Planting of new forests on lands which historically have not contained forests. These newly created forests are included in the category "Managed Forests" in the Land-use Change and Forestry module of the emissions inventory calculations. See also reforestation.

Albedo - The surface reflectivity of the globe. Affects the amount of solar radiation being radiated back into space without being absorbed by the earth's climate system.

Anthropogenic emissions - Emissions resulting from human activities.

Appliance - Any household energy-using device.

Base year - The year for which the inventory is to be taken. This is currently 1990. In some cases (such as estimating CH_4 from rich production), the base year is simply the last year of a number of years over which an average must be taken.

Biodiversity - Biological diversity, i.e., the variety of species in a given area.

Biofuels - Wood, waste, and alcohol fuels.

Biomass - Organic material both above the ground and below ground, and both living and dead, e.g., trees, crops, grasses, tree litter, roots, etc. When burned for energy purposes, these are referred to as biomass fuels.

Biosphere - Refers to the zone of the earth and atmosphere that contains living organisms. The terrestrial biosphere excludes the oceans.

Bottom-up modeling - A modeling approach which arrives at economic conclusions from an analysis of the effect of changes in specific parameters on narrow parts of the total system.

Carbon tax - A tax on fossil fuels based on the individual carbon content of each fuel. Under a carbon tax, coal would be taxed the highest per MBtu, followed by petroleum and then natural gas.

Carbon cycle - General term used in reference to the sum of all reservoirs and flows of carbon on Earth. The flows tend to be cyclic in nature; for example, carbon removed from the atmosphere (one reservoir) and converted into plant tissue (another reservoir) is returned back into the atmosphere when the plant is burned.

Carbon reservoir or sink - Within the carbon cycle, the physical site at which carbon is stored (e.g., atmosphere, oceans, Earth's vegetation and soils, and fossil fuel deposits).

CFCs (Chlorofluorocarbons) - A family of inert gases, including CFC-11, CFC-12, and CFC-113.

Climate - The statistical collection and representation of the weather conditions for a specified area during a specified time interval (usually decades).

Closed forest - A dense forest with closed canopy through which sunlight does not penetrate sufficiently for grasses to grow on the forest floor. These forests contain a significantly greater amount of biomass per hectare than open forests.

Cogeneration - The simultaneous generation of both electric power and heat; the heat, instead of being discharged without further use, is used in some fashion (e.g., in district heating systems).

Cultivar - Variety of plant species.

Deforestation - Converting forest land to other vegetation or uses (e.g., cropland, pasture, dams).

Degradable organic carbon - Organic material which can decay, expressed as weight of carbon. Usually 15 to 25% of total waste.

Demand-side management - The planning, implementation, and monitoring of utility activities designed to encourage customers to modify their pattern of electricity usage.

Discount rate - The rate at which money grows in value (relative to inflation) if it is invested.

Dynamic - In the field of modeling, a dynamic model includes inter-temporal relations between variables. A model that does not include such relations is called static.

Dynamic programming - A method to find an optimal time path.

Emission factor - A coefficient that relates actual emissions to activity data as a standard rate of emission per unit of activity. Emission factors are often based on a sample of measurement data averaged to develop a representative rate of emission for a given activity level under a given set of operating conditions.

Endogenous variables - Variables determined within the system under consideration.

Energy forms and levels - Primary energy is energy that has not been subjected to any conversion or transformation process. Secondary energy (derived energy) has been produced by the conversion or transformation of primary energy or of another secondary form of energy. Final energy (energy supplied) is the energy made available to the consumer before its final conversion (i.e., before utilization). Useful energy is the energy made usefully available to the consumer after its final conversion (i.e., in its final utilization).

Energy intensity - The amount of energy required per unit of a particular product or activity.

Energy services - The service or end use ultimately provided by energy. For example, in a home with an electric heat pump, the service provided by electricity is not to drive the heat pump's electric motor but rather to provide comfortable conditions inside the house.

Engineering approach - A particular form of bottom-up modeling in which engineering-type process descriptions (e.g., fuel efficiency of end-use devices) are used to calculate a more aggregated energy demand. This term is particularly used in contrast to econometric models.

Enteric fermentation - The intestinal fermentation which occurs in ruminant animals such as cows; it is a major biological source of methane.

Exogenous variables - Variables which are determined outside the system under consideration. In the case of energy planning models, these may be political, social, environmental, and so on.

Feedback - When one variable in a system (e.g., increasing temperature) triggers changes in a second variable (e.g., cloud cover) which in turn ultimately affects the original variable (i.e., augmenting or diminishing the warming). A positive feedback intensifies the effect. A negative feedback reduces the effect.

Fossil fuel - Coal, petroleum, or natural gas or any fuel derived from them.

General equilibrium analysis - An approach which considers simultaneously all the markets in an economy, allowing for feedback effects between individual markets. It is particularly concerned with the conditions which permit simultaneous equilibrium in all markets, and with the determinants and properties of such an economy-wide set of equilibrium.

Greenhouse effect - An atmospheric process by which greenhouse gases (such as CO_2, CH_4, N_20, and CFCs) affect the global energy balance. Shortwave radiation from the sun that reaches the earth and is re-emitted as longwave infrared radiation is partially absorbed by greenhouse gases (GHGs). In the absence of GHGs, the earth's average temperature would be 18° C rather than 15° C .

Greenhouse gas - Any gas that absorbs infrared radiation in the atmosphere.

Global Warming Potential (GWP) - Some greenhouse gases are more effective, on a unit basis, of affecting, or “forcing," the climate system. The GWP combines the capacity of a gas to absorb infrared radiation and its residence time in the atmosphere with a time frame of analysis, then expresses the result relative to CO_2.

Income elasticity - The expected percentage change in the quantity demand for a good given a one percent change in income. An income elasticity of demand for electricity of 1.0 implies that a one percent increase in income will result in a one percent increase in demand for electricity.

Input-output analysis - Method of investigating the interrelationship between the branches of a national economy in a specific time period. The representation, in the form of a matrix table, is called an input-output table. An input-output analysis allows the changes in total demand in related industrial branches to be estimated.

Least-cost planning - In energy planning, the practice of basing investment decisions on the least-costly option for providing energy services. It is distinguished from the more traditional approach taken by utilities, which focuses on the least-costly way to provide specific types of energy, with little or no consideration of less-costly alternatives that provide the same energy service at lower costs.

Life-cycle cost - The cost of a good or service over its entire life cycle.

Linear programming - A practical technique for finding the arrangement of activities which maximizes or minimizes a defined criterion subject to the operative constraints. For example, it can be used to find the most profitable set of outputs that can be produced from a given type of crude oil input to a given refinery with given output prices. The technique can deal only with situations where activities can be expressed in the form of linear equalities or inequalities, and where the criterion is also linear.

Macro-economics - The study of economic aggregates and the relationships between them. The targets of macro-economic policy are the level and rate of change of national income (i.e., economic growth), the level of unemployment, and the rate of inflation. In macro-economics, the questions about energy are how its price and availability affect economic growth, unemployment, and inflation; and how economic growth affects the demand for energy.

Manure - Waste materials produced by animals that are managed for agricultural purposes. When manure is managed in a way that involves anaerobic decomposition, significant emissions of methane can result.

Marginal costs - In a linear programming environment, this term has the very specific meaning of change of the objective function value as a result of a change in the right-hand-side value of a constraint. If, for example, the objective is to minimize costs, and if the capacity of a particular energy conversion facility, such as a power plant, is fully utilized, the marginal cost in the linear programming sense expresses the (hypothetical) reduction of the objective function value (i.e., the benefit) of an additional unit of capacity.

Market clearing - The economic condition of supply equaling demand.

Open forests - Open forests are less dense than closed forests, do not have a closed canopy, and have grasses growing on the forest floor. These forests contain less biomass per hectare than closed forests.

Optimization model - A model describing a system or problem in such a way that the application of rigorous analytical procedures to the representation results in the best solution for a given variable(s) within the constraints of all relevant limitations.

Price elasticities - The expected percentage change in quantity demand for a good given a one percent change in price. A price elasticity of demand for electricity of -0.5 implies that a one percent increase in price will result in a half percent decrease in demand for electricity.

Radiative forcing - Changes in the global balance of incoming solar radiation and outgoing infrared radiation caused by a radiative forcing agent, such as clouds, surface albedo, and greenhouse gases. This results in changes in the global climate.

Reforestation - Planting of forests on lands which have, historically, previously contained forests but which have been converted to some other use. Replanted forests are included in the category “Managed Forests" in the Lands Use Change and Forestry module of the emissions inventory calculations. See also afforestation.

Renewable energy - Energy obtained from sources that are essentially inexhaustible (unlike, for example, the fossil fuels, of which there is a finite supply). Renewable sources of energy include wood, waste, wind, geothermal, and solar thermal energy.

Retrofit - To update an existing structure or technology by modifying it, as opposed to creating something entirely new from scratch. For example, an old house can be retrofitted with advanced windows to slow the flow of energy into or from the house.

Ruminant animals - Herbivores (grazing animals such as cattle, buffalo, sheep, goats, and camels) which have a large free stomach or rumen. Digestion in anaerobic conditions in the rumen can create significant emissions of methane from ruminant animals.

Scenario - Coherent and plausible combination of hypotheses, systematically combined, concerning the exogenous variables of a forecast.

Sensitivity analysis - A method of analysis which introduces variations into a model's explanatory variables in order to examine their effects on the explained.

Sequester - To isolate and remove something. As used here, the processes by which carbon dioxide is removed from the atmosphere and retained for some period in a carbon reservoir (e.g., trees).

Simulation model - Descriptive model based an a logical representation of a system and aimed at reproducing a simplified operation of this system. A simulation model is referred to as static if it represents the operation of the system in a single time period; it is referred to as dynamic if the output of the current period is affected by evolution or expansion compared with previous periods. The importance of these models derives from the impossibility or excessive cost of conducting experiments on the system itself.

Sustainable - A term used to characterize human activities that can be undertaken in such a manner as to not adversely affect the environmental conditions (e.g., soil, water quality, climate) necessary to support those same activities in the future.

Temperate - Relating to the region between the tropics and the polar circles (between 23.5° and 66.5°) in both hemispheres.

Top-down modeling - A modeling approach that proceeds from broad, highly aggregated generalizations to regionally and/or functional disaggregated details.

Tropical - Relating to the region between the Tropic of Cancer and the Tropic of Capricorn, 23.5° North and 23.5° South, respectively.

User interface - All information, including push-button help texts, facilitating the technically correct operation of a computer program.